REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

The present invention provides an irradiation apparatus that contains a discharge lamp and a lighting system capable of applying light radiation from the discharge lamp to a photosensitizer having a relatively large adsorption coefficient within certain wavelength ranges suitable for photodynamic therapy (PDT) or photodynamic diagnosis (PDD). For PDT, light capable of penetrating tissue and having wavelengths in the range of 600nm-800nm is used. For PDD, light capable of causing the photosensitizer to fluoresce and having wavelengths in the range of 400-440nm is used. The discharge lamp of the present invention emits minimal light outside the wavelength range suitable for PDT and PDD, which reduces the sensation of heat experienced by patients undergoing PDT or PDD using conventional discharge lamps emitting unnecessary wavelengths.

Claims 1-3, 6-7, 14 and 16-20 are rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 3,958,145 ("Jack"). In addition, Claims 1 and 4-5 are rejected under 35 U.S.C. § 103(a) over Jack in view of JP54-30228 ("Tokyo"). Claim 8-10, 13-15 and 19 are rejected under 35 U.S.C. § 103(a) over Jack in view of U.S. Patent No. 4,336,809 ("Clark"). Claims 11-12 are rejected under 35 U.S.C. § 103(a) over Jack in view of Tokyo and further in view of Clark.

Jack discloses a high pressure mercury vapor discharge lamp comprising a rare gas, mercury, halides of ***tin*** (with the exception of fluoride) and halides of lithium with the exception of fluoride), where up to a maximum of 50 mol% of the lithium halide may be replaced by sodium halide. Jack at abstract. An object of the Jack invention is to provide ***tin*** halide-comprising high pressure mercury vapor discharge lamps which have a low color temperature of the emitted radiation while retaining a high radiation efficienciency and a satisfactory color rendition. Jack at column 2, lines 3-7. Jack discloses that the radiation,

produced from high pressure mercury vapor discharge lamps that also contain ***tin*** halides, mainly originates from the ***tin*** halide molecules and has a *very broad continuous spectrum*, which results in a very satisfactory color rendition. Jack at column 1, lines 38-47.

Tokyo discloses a metal vapor discharge lamp filled with a ***rare earth metal*** halide, sodium halide, potassium halide and/or rubidium halide. Tokyo at English-language abstract.

Clark is discloses that a tissue photoradiation system uses a hematoporphyrin or hematoporphyrin derivative dye in tissue to be irradiated and arranges a xenon ion laser for simultaneous lasing of deep blue light and red light. Clark at abstract. The Final Rejection cites Clark for teaching "a means for selecting a wavelength in an irradiation apparatus". Final Rejection at page 2, lines 16-17.

However, the cited prior art fails to suggest the limitations of independent Claims 1 and 8 of an irradiation apparatus comprising a discharge lamp in which "tin or rare-earth metal is not filled", or the independent Claim 16 limitation that "the discharge lamp does not contain tin or rare-earth metal".

Because the cited prior art fails to suggest all of the limitations of the claimed invention, the rejections under 35 U.S.C. § 102 and § 103 should be withdrawn.

Pursuant to MPEP § 821.04, after independent product Claims 1, 8 and 16 are allowed, Applicants respectfully request examination and allowance of method Claims 18-20, which include all of the limitations of independent product Claims 1, 8 and 16, respectively.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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Attachment:
The Practicing Scientist's Handbook, pages 532-537

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TABLE 111. FLAME SPECTRA OF THE ELEMENTS*

Legend: AH air-hydrogen, OH oxyhydrogen, OA oxyacetylene, OC oxycyanogen; solvent is water. AHn, OHn, OAn, the corresponding flames with nonaqueous solvent is indicated, for each group of data, by the following symbols: AA acetylacetone, Ac acetone, Bu Butanol, Bz benzene, C chloroform, EA 1:2:1 ether-alcohol-water, G gasoline, H hexone, K kerosene, M methanol, N naphtha, P isopropanol; subscript number indicates percentage, e.g., Ac_{60} = 60% acetone + 40% water. Other notations: ( ) very doubtful; a arc line, b band peak, c continuum or very wide band, d double, f intercombination line, i inner cone emission, k with an S-1 photomultiplier, m multiple, p resonance line, r head of red-degraded band, s spark line, t triple, u unclassified line, v head of violet-degraded band, w wide or diffuse band, x with uncoated mirror in burner housing (mirror normally has a silicone coating).

Notes: (1) Seen in absorption against an effectively hotter $\overline{OH}$ band. (2) Data to be provided by Kniseley, Fassel and Curry, *Spectrochimica Acta.* (3) Obscured by CN bands. (4) Bands emitted only from iodate solution. (5) For 1P28 photomultiplier with red filter. (6) The arc lines 382.94, 383.23, 383.83 sometimes appear within this band. (7) The stronger bands 386–388 are interfered with by CH 387, 389.

Species	Character	Wavelength mμ	Intensity in various flames						
			AH	AHn	OH	OHn	OA	OAn	OC
Ag	p	328.07	100		100	100 EA	50	30 EA	25
	p	338.29	250		170	170	50	40	20
Al	p	394.40	pc 0.3		0.8	20 H	1	100 H	25
	p	396.15	pc 0.35		1.0	30	2	200	30
AlO	r	467.2	rc 0.8		2	10	0.15	17	0.0
	r	484.2	1.5		3	50	0.3	70	0.0
	r	510.2	rc 1		2	10	0.2	17	0.0
As	a	228.81 x		2.5					0.1
	a	234.98 x		4			(0.1) i		0.03
Au	p	242.80 x	0.1		1		1.1		
	p	267.60 x	0.3		2		1.7		
BO_2	db	494	5		30	50 Bu_4	5	8 M_{50}	0.0
	b	518.0	8		50	80	6	15	0.0
	b	547.6	11		60	90	15	17	0.0
	b	579	7		30	70	10	10	0.0
Ba	p	553.56	170		40	100 Bu_4	50	50 N	5
Ba^+	s	455.40	c 8		8	20	10	100	100
	sb	493.41	c 80		25	40	50	100	70
BaOH	b	488	100		30	40	50	5	0
	b	513	150		30	50	70	5	0
	b	830	200 k		30	25 Bz	5	(300)	0
	b	873	80 k		30	25	5	(300)	0
Be	p	234.86 x	0.0		0.0		0.0		10
BeO	r	470.9 }	rc 0.2		0.7		0.25		
	r	473.3 }			0.5		0.2		
Bi	dp	223.0 x		7 P					0.0
	p	306.77	0.2	0.2	0.017		0.01 i[1]		3
	a	472.26	0.5	0.00	0.25	0.005 P	0.05		0.0
Ca	p	422.67	250		1000	1700 Bu_4	250	1000 EA	400
Ca^+	s	393.37			sc 25		sc 30		500
CaOH	b	554	500		1700	2500 Bu_4	170	700 EA	10
	b	602	100		700	1000	250	300	3
	b	622	500		2500	5000	500	1000	10
Cd	p	228.80 x	0.2	20 P	1	17 P_{50}	0.25		20
	f	326.11	20	6	2	5 Ac	0.25	5 Ac [2]	0.4
CeO	bc	494	c 40		7	5 Ac	c 0.7		
(Ce)	c	550–600	70		10	10	0.7		
Co	a	340.51	40		20	30 Bu_4	5		9
	dpf	341.25	40		25	30	3		9
	dap	345.4	45		25	50	7		50
	a	350.23	30		17	30	3		7
	tap	352.8	35		35	50	7		10 [3]
	da	387.35	30		20	30	4		
Cr	a	357.87	40	15 P_{25}	80	80 N	20	1000 H	50
	p	425.43	120	15	100	150 Ac_{60}	20	900	120
	p	427.48	110	8	80	110	17	550	110
	p	428.97	100		70	80	12	300	80
	ta	520.6	ac 170		70	70 Bu_4	10	100	80
CrO	rc	579.4	250		20	120 Bu_4	15		0
Cs	a	455.54	20		25	30 Bu_4	0.3		0.03
	p	852.11 k	1000		1000	2000	1000		40
	p	894.35 k	300		300	700	300		10
Cu	p	324.75	60	40 P_{25}	100	500 M	100	300 K	30
	p	327.40	40	25	100	500	100	300	20
CuOH	w	537	100		17	20 Bu_4	6		0
DyO	mr	526.3			70	80 H		[2]	
	b	540.0			60	70			
	b	572.9			120	150			
	b	583.3			120	150			
ErO	b	504			30	55 H		[2]	
	b	552			50	80			
Eu	p	459.40			25	35 H	10	[2]	
	p	462.72			20	30	10		
(EuOH)	bc	598			100	120 H	(10)		
	wc	623			70	100	(10)		
	wc	647			25	150	(10)		
	w	702			50	100	(10)		
Fe	a	302.06	4	5 P_{25}	2.5	50 H	1.5		50
	p	371.99	80	11	40	50 Bu_4	15	100 AA	20
	(d)p	373.71	80	10	30	50	8	70	14
	tp	374.7	70	8	25	50	6	50	11 [3]
	(d)p	385.99	70	9	35	50	11	70	

TABLE 111. (*Continued*)

Species	Character	Wavelength mμ	Intensity in various flames AH	AHn	OH	OHn	OA	OAn	OC
FeO	rc	564.7	c 170		40	120 Bu_4	10	3 M_{50}	0
	rc	581.9	c 170		40	120	11	3	0
Ga	p	403.30	10		100	150 Bu_4	10		
	p	417.21	20		200	300	20		
GdO	r	461.6			17	30 H		[2]	
	mrc	580.7	(5)		50	120	(10)		
	mrc	598.7	(10)		80	250	(20)		
	bc	622	(10)		70	250	(20)		
Ge	u	259.25 x		0.7 P		0.025 P_{50}	0.015 i	0.025 i P_{50}	
	dp	265.14 x	0.00	2	0.01	0.03	0.04 i	0.05 i	
Hg	f	253.65 x	1.7	2.5 P	0.3	1.7 Ac	{0.2 1.2 i		
HoO	r	515.7			50	50 H		[2]	
	b	527			50	50			
	b	532.0			50	50			
	b	565.9			120	170			
IO	rc	484.5			(1)[4]				0.00
	rc	513.1			(1)				0.00
	rc	530.8			(1)				0.00
In	p	410.18	150	50 P_{25}	200	300 Bu_4	50		
	p	451.13	250	80	350	500	70		
K	da	404.5	30	1 P_{25}	70	100 Bu_4	10		0.15
	p	766.49 k}	10,000		30,000	50,000	{30,000		}300
	p	769.90 k}					20,000		
LaO	mr	438.0	5		25	25 H	17	80 H	
	mr	442.3	5		25	30	17	80	
	r	560.0	17		70	100	17	170	
	mr	743 k	30		20	1000	100	120	
	mr	792 k	25		20	1000	100	150	
Li	a	610.36	30		20	30 Bu_4	10		25
	p	670.78[5]	10,000	1500 P_{25}	50,000	70,000	10,000		3000
LuO	mr	466.2			30	80 H		[2]	
	mr	517.0			50	110			
Mg	p	285.21	100	20 P_{25}	100	250 Ac	70	100 EA	1000
MgOH	b	370.2	500	60	100	100 EA	5		0
	mb[6]	381–383	500	50	80	80	3.5		0
Mn	tp	403.2	500		1000	1500 N	500		120
MnO	r	538.9	100		50	80 Bu_4	8		0.2
	r	558.6	120		80	120	17		0.15
Mo	p	379.93	c 2.5	0.0 P_{80}	c 0.8	10 i N	(0.5) i	20 $H_{50}Ac_{20}P_{20}$	3
	p	386.41	c 3	0.0	c 0.8	10 i	(0.3) i	20	1[3]
	p	390.30	c 3	0.0	c 0.8	5 i	(0.25) i	20	11
(MoO_2)	c	550–600	25		10		(3)		0
NC	dv	385.3[7]				0.17 iN			
NO	dv	226.3 x		0.4 P					
	dv	236.3 x		0.5					
Na	da	330.3	2.5		20	10 Bu_4	10		0.5
	dp	589.2	30,000		50,000	70,000	25,000		2000
	da	819 k			5	10	20		10
(Nb)	c	550	5		1		0.3		
NdO	mb	660			10	100 H	10	[2]	
	bc	691			10	500	5		
	bc	702 k			10	500	10		
	tbc	712 k			10	500	10		
Ni	p	341.48	80	25 P_{25}	50	60 Bu_4	10		50
	dp	346.0	45	15	20	30	7		20
	p	349.30	25	10	17	25	7		20
	p	351.51	45	15	22	30	9		20
	p	352.45	80	25	50	80	15	(50) C	30
	a	361.94	40	10	22	30	5		20
PO	vb	238.3 x	0.4	8 P					
	v	246.4 x	0.5	10					
(P)	c	520	30						
Pb	a	363.96	1.5	2 G	5	7 G	0.1	5 G	2.5
	a	368.35	3	4	10	15	0.2	10	7
	a	405.78	3	4	10	15	0.3	10	7
Pd	a	340.46	45		70	200 H	10		80
	a	360.95	30		45	90	7		50
	a	363.47	55		80	150	10		100
(PmO)	b	(640)			(10)	(50) H	(1)		
	b	(680)			(10)	(50)	(1)		
PrO	rc	576.3			15	11 H		[2]	
	dr	603			10	20			
	bc	709.5 k			(10)	50			
	drc	735 k			(10)	30			
Pt	p	265.95 x	0.11		0.8		0.5		8
	p	306.47	0.25		1		0.7		7
Ra	p	482.59			(5)				
Ra^+	s	381.44			(3)				

TABLE III. (*Continued*)

Species	Character	Wavelength mμ	Intensity in various flames						
			AH	AHn	OH	OHn	OA	OAn	OC
(RaOH)	b	627			(5)				
	b	665			(5)				
Rb	a	420.19	20		35	50 Bu_4	2		0.1
	p	780.02 k	3500		3500	5000	2000		100
	p	794.76 k	2500		2500	3000	1700		50
Re	p	488.92			(0.1)				
	p	527.55			(0.1)				
Rh	p	339.68	pc 4		8	12 P	5	8 P	
	p	343.49	2.5		15	25	9	17	
	p	350.25	pc 3.5		8	10	5	8	
	a	365.80	ac 6		11	15	6	9	
	p	369.24	7		35	40	15	22	
	a	370.09	ac 6		11	11	4.5	8	
Ru	p	349.89			5	30 M_{50}	3		
	p	372.80			20	150	30		
	tp	379.9			10	100	25		
Sb	p	217.59 x		17 P					
	a	231.15 x	0.07	25					0.2
	a	252.85 x	0.01	8			(0.1) i		
	a	259.81 x	0.025	7			(0.1) i		
ScO	r	485.8			20	60 H		2	
	r	581.2			40	150	5		
	tr	607.3			250	1700	30		
	tr	611.0			200	1200	25		
SiO	r	241.4 x		0.00 P_{50}		(0.1)			
	r	248.7 x		0.00		(0.1)			
	r	256.4 x		0.00		(0.1)			
SmO	mbc	614			40	80 H	2	2	
	mbc	624			30	80	2.5		
	tbc	642			20	100	2		
	mbc	652			20	110	3		
Sn	a	235.48 x		15 P		1.5 iP			
	a	242.95 x		15		1.5 i			
	a	270.65 x	0.08	12	0.012		1.7 i		
	a	284.00	0.08	11	(0.015)		0.2 i		8
	p	303.41	0.4	12	0.05		{0.05 0.4 i		10
SnO	r	358.5	3	0.5 P_{25}	0.9	0.22 Ac_{60}	0.2		
Sr	p	460.73	500	150 P_{25}	1000	2000 Ac_{60}	200		150
Sr^+	s	407.77			30	50 Bu_4	17		400
SrOH	b	605	5000	250 P_{25}	1000	1500 Bu_4	100		
	b	666	500		700	1000	40		
	b	680	250		1000	1000	30		
TbO	b	534			40	60 H		2	
	bc	573			50	100			
	bc	592.1			80	170	(10)		
	bc	598.0			70	150	(10)		
Te	da	238.5 x	0.01	1 P			0.000		
TeO	drc	371.4	3.5		0.3		c 0.015		
	drc	377.3	3.5		0.2		c 0.015		
	trc	382.7	3.5		0.25		c 0.017		
	trc	388.4	3.5		0.25		c 0.017		
TiO	rc	516.7			40		1.5	1.5 P	
	rc	544.9			45		1.5	1.5	
	rc	575.9			45		1.5	1.5	
	bc	715			20		10		
Tl	p	377.57	50		100	170 Bu_4	10		6
	a	535.05	30		70	100	5		8
TmO	b	491			30	50 H		2	
	b	538			35	60			
	b	541.5			35	60			
(UO_2)	c	550	15		5				
V	ta	318.4		0.00 P_{50}					23
VO	rc	522.9	80	c 17 P_{50}	30	80 Bu_4	5		0.0
	rc	547.0	100	c 17	40	100	7		0.0
	rc	573.7	110	c 30	40	110	10		0.0
YO	r	481.8			30	50 H		2	
	mr	599			300	1000	30	70 H	
	mr	615			300	800	30	50	
Yb	a	398.80	70		25	120 H	(10)	2	
	pb	555.65	250		70	60	(10)		
(YbOH)	b	498.1	200		50	50 H	(5)		
	b	532.5	250		80	80	(5)		
	b	572.5	300		110	100	(10)		
Zn	p	213.86 x	0.04	0.15 P_{50}	0.06	1 Ac	0.017		6
	a	481.05	c 0.3		c 0.06	0.6 iN	i	c 6 Ac	
(Zn)	c	520–600	0.5		0.12	12 Ac		4	0
ZrO	bc	564			1.2		(0.1)		0
	bc	574			1.2		(0.1)		0

*Reproduced from: Clark, George L., Ed.,"The Encyclopedia of Spectroscopy," Van Nostrand Reinhold, New York, 1960. References to this table may be found in this Encyclopedia. The intensities are computed for the Beckman DU spectrophotometer with flame and photomultiplier attachments; the intensity J = 100(R – B)/B, where B is the blank reading for the pure solvent and R is the reading for a solution containing 10 mg of the element per liter for the slit width at which, for the blank, shot-effect noise equals flame flicker.

Van Nostrand Reinhold Company Regional Offices:
New York Cincinnati Atlanta Dallas San Francisco

Van Nostrand Reinhold Company International Offices:
London Toronto Melbourne

Library of Congress Catalog Card Number: 77-5866
ISBN: 0-442-25584-5

Manufactured in the United States of America

Published by Van Nostrand Reinhold Company
135 West 50th Street, New York, N. Y. 10020

Published simultaneously in Canada by Van Nostrand Reinhold Ltd.

15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Library of Congress Cataloging in Publication Data
Moses, Alfred James, 1921–
The practicing scientist's handbook.

Includes index.
1. Matter–Properties–Handbooks, manuals, etc.
2. Materials–Handbooks, manuals, etc. I. Title.
QC173.397.M67 530.4 77-5866
ISBN 0-442-25584-5